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| APPLICATION NO.               | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/559,531                    | 12/02/2005  | Yutaka Takeuchi      | 025416-00024        | 2704             |
| 4372                          | 7590        | 04/21/2009           | EXAMINER            |                  |
| ARENT FOX LLP                 |             |                      | ZHU, WEIPING        |                  |
| 1050 CONNECTICUT AVENUE, N.W. |             |                      | ART UNIT            |                  |
| SUITE 400                     |             |                      | PAPER NUMBER        |                  |
| WASHINGTON, DC 20036          |             |                      | 1793                |                  |
|                               |             |                      | NOTIFICATION DATE   | DELIVERY MODE    |
|                               |             |                      | 04/21/2009          | ELECTRONIC       |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DCIPDocket@arentfox.com

IPMatters@arentfox.com

Patent\_Mail@arentfox.com

### Office Action Summary

**Application No.**

10/559,531

**Applicant(s)**

TAKEUCHI ET AL.

**Examiner**

WEIPING ZHU

**Art Unit**

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 February 2009 and 29 January 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 13-23 is/are pending in the application.
- 4a) Of the above claim(s) 20-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SI/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 26, 2009 has been entered.

### ***Status of Claims***

2. Claims 13-19 are currently under examination wherein claims 14 and 19 have been amended in applicant's amendment filed on January 29, 2009.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 13-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kajikawa et al. (US 4,309,227) in view of JP 2000-045061.

With respect to claims 13, 17 and 18, Kajikawa et al. ('227) discloses a nitriding treatment method for performing a nitriding treatment for a workpiece in a heat treatment

furnace, the method comprising (abstract, col. 3, lines 11-66 and col. 4, line 11 to col. 5, line 12):

a first step of applying a voltage between the furnace and the workpiece to start heating the workpiece by means of generated glow discharge and

a second step of decreasing the voltage (i.e. the current density as claimed) after a temperature of the workpiece is in the range of 300° C to 400° C and then heating the workpiece up to a desired nitriding treatment temperature by using a heating element, wherein

the nitriding treatment is performed by means of nitrogen ions generated by the glow discharge.

Kajikawa et al. ('227) does not disclose the voltage is a pulse voltage having a predetermined current density as claimed. JP ('061) discloses using a pulse voltage for ion nitriding (abstract). JP ('061) does not disclose the pulse voltage having a current density of 0.05 to 7 mA/cm<sup>2</sup> and at a frequency of not less than 1 kHz as claimed. However, it has been held that discovering an optimum value of a result-effective variable involves only routine skill in the art; see *In re Boesch*, 617, F.2d 272, 205 USPQ 215 (CCPA 1980). In the instant case, the current density and the frequency of the pulse voltage are result-effective variables, because they would directly affect the quality of the glow discharge as disclosed by JP ('061) (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the current density and the frequency as disclosed by JP ('061) in order to achieve desired quality of the glow discharge.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a pulse voltage in the process of Kajikawa et al. ('227) in order to obtain optimum narrow glow discharge as disclosed by JP ('061) (abstract).

With respect to claim 14, Kajikawa et al. ('227) discloses that the workpiece is heated by heat generated by the glow discharge and the heating element in both first and second steps (col. 4, line 11 to col. 5, line 12). Kajikawa et al. ('227) does not specify that the heating is effected in the second step such that an amount of heat generated by the heating element is higher than that at any time in the first step as claimed. However, Kajikawa et al. ('227) discloses that at the beginning of the second step the voltage level of the glow discharge is dropped from 700 V in the first step to 540 V while the workpiece is further heated up to the optimum temperature, indicating it likely that the heat generated by the heating element in the beginning of the second step is higher than that at any time in the first step as claimed (col. 4, lines 11 to col. 5, line 12).

With respect to claim 15, Kajikawa et al. ('227) does not limit the rate at which the voltage is decreased, and therefore reads on the gradual decrease as claimed.

With respect to claim 16, Kajikawa et al. ('227) discloses that the nitriding treatment temperature is maintained to execute the nitriding treatment after the workpiece arrives at the desired nitriding treatment temperature in the second step (col. 5, lines 1-12).

4. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kajikawa et al. (US 4,309,277) in view of JP 2000-045061 as applied to claim 13 above and further in view of JP 09-079912.

With respect to claim 19, Kajikawa et al. ('227) discloses sensing the radiation temperature of the workpiece by a thermocouple (col. 3, lines 20-25). Kajikawa et al. ('227) in view of JP ('061) does not disclose the rest of the claimed feature. JP ('912) discloses detecting the difference between the radiation and the contact temperatures of a simulated hot-rolling sheet (abstract), which reads on the claimed method for detecting a temperature difference between a radiation temperature and a contact temperature of a dummy workpiece arranged in the heat treatment furnace. It would have been obvious to one of ordinary skill in the art at the time the invention was made to detect the difference between the radiation and the contact temperatures of a dummy workpiece arranged in the heat treatment furnace of Kajikawa et al. ('227) in view of JP ('061) as disclosed by JP ('912) in order to correct the radiation temperature of the workpiece detected simultaneously with the difference and determine the real surface temperature of the workpiece as disclosed by JP ('912) (abstract).

### ***Response to Arguments***

5. The applicant's arguments filed on January 29, 2009 have been fully considered but they are not persuasive.

First, the applicant argues that Kajikawa et al. ('227) heats the workpiece only by the heating element at the time of start heating. Further, until the workpiece reaches the

optimum temperature for nitriding, the power of the heating element is reduced rather than increased in Kajikawa et al. ('227) in contrast to what is instantly claimed. In response, see the reasons for the rejections of the claimed features as stated above. It is noted that the Figures 3 and 4 of Kajikawa et al. ('227) are only diagrammatic. They do not completely agree with what is described in the specification in terms of the heat-radiating element output and glow discharge voltage level at different stages of the nitriding process.

Second, the applicant argues that Kajikawa et al. ('227) does not disclose the claimed feature of the instant claim 14. In response, see the new ground of rejection of the claimed feature as stated above.

Third, the applicant argues that there is no teaching of a gradual decrease of the DC voltage generating the glow discharge. In response, the examiner notes the reason of the rejection of the instant claim 15 as stated above. The examiner thus believes the rejection of this claim to be proper and is maintained.

Fourth, the applicant argues that JP ('912) does teach measuring contact and radiation temperatures to calculate a later useable correction factor. However, the object that is measured is a simulated sheet undergoing simulated hot rolling in simulated hot rolling conditions. In response, see the reasons for the rejection of the instant claim 19 as stated above. It would have been obvious to one of ordinary skill in the art that the method to measure the contact and radiation temperatures of an object to derive a temperature correction factor as disclosed by JP ('912) could be successfully employed in many applications, where the contact temperature of the

object is difficult to get, by disposing a dummy in the environment wherein the object is disposed. The combination of Kajikawa et al. ('227) in view of JP ('061) and JP ('912) with a proper motivation as stated above renders the feature in instant claim 19 obvious to one of ordinary skill in the art.

### ***Conclusions***

6. This Office action is made non-final. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Weiping Zhu whose telephone number is 571-272-6725. The examiner can normally be reached on 8:30-16:30 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/George Wyszomierski/  
Primary Examiner  
Art Unit 1793

WZ  
4/8/2009